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Title

Public health in the UK media: Cognitive Discourse Analysis and its application to a drinking water emergency

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Gabriella Rundblad is a Lecturer in Applied Linguistics at King's College London, specialising in the interface between language, cognition and behaviour. She has been PI on three recent projects investigating communication about drinking water. Her research explores authority, factuality, and impersonalisation in different types of lay/professional health discourse, including government/non-government websites and media reports on immunisation, as well as the discourse of medical research articles. Work on health communication has allowed her to develop a new text analysis approach, Cognitive Discourse Analysis, which draws upon Critical Discourse Analysis, Systemic Functional Linguistics and Frame Semantics. Dr Rundblad also studies the language and cognitive development of children/adults with/without language disorders.

Public health in the UK media: Cognitive Discourse Analysis and its application to a drinking water emergency

1. Introduction

While rainy school holidays are nothing new for the UK, the summer of 2007 was the wettest on record (The Environment Agency, 2007). Particularly hard hit was the county of Gloucestershire and its neighbouring Midlands areas, where the equivalent of two months of rain (125mm) fell on the 19th-20th July (Pitt, 2008).

The resulting crisis was the largest natural disaster experienced in the UK. In addition to widespread surface water flooding of homes and businesses, fluvial flooding from the River Severn and the River Avon inundated the Mythe water treatment works, rendering the provision of mains water impossible. Approximately 350,000 residents lost their drinking water supply for up to 17 days. Alternative supplies had to be made available through bottled water and bowsers (static water tanks). When the mains water was returned, residents were issued a Do Not Drink notice followed by a Boil Water notice 7 days later. The loss of mains water and sourcing of temporary supplies represented the UK's largest peacetime emergency since World War II (Pitt, 2008). An emergency response unit, known as Gold Command, was initiated under the control of the local police. While the provision of drinking water remains the legal responsibility of the water company (in this case Severn Trent Water), over 25 different agencies - including the military - were involved in the disaster response (Gloucestershire Constabulary, 2008).

This study explores the representations of the various authorities and the general public in the UK media coverage of the drinking water crisis. We analyse the clarity with which the different authorities' responsibilities were portrayed and discuss the implications for public understandings of authority roles. We also analyse how the language of the drinking water advice reported by the media may have reduced the affected public's comprehension of and obligation to comply with that advice.

2. The media and natural disasters

During natural disasters, the affected public typically turn to media sources for up to date information and advice. Regardless of whether the information is transmitted via television (Piotrowski and Armstrong, 1998, Spence et al., 2007), radio (Cretikos et al., 2008), email or mobile phone (Hayden et al., 2007), it is imperative that the advice is timely, accurate, clear and delivered by a trustworthy source (Glik, 2007). Failure to fulfil these criteria will result in a lack of public comprehension of the advice, which ultimately increases confusion and anxiety, reduces compliance levels and can risk public health and safety (Glik, 2007).

During this drinking water incident, affected consumers showed a preference for local media sources rather than the official health leaflets (Rundblad et al., 2010). The local radio was the most consulted information source and those who used local newspapers reported higher levels of clarity. Yet compliance with the advice was low (Rundblad et al., 2010), which suggests that the consulted media sources did little to aid public comprehension of the advice.

2.1. Human responsibility in disasters

Reflecting a wider belief upheld by society, natural disasters are often represented by authority figures as acts of God that are inevitable and resistant to human intervention (Steinberg, 2000). Perhaps due to this belief or perhaps due to lack of clarity over human responsibility, media coverage of natural disasters can be prone to an absence of human agency (Harwell, 2000). However, during and after a disaster, it is likely that the affected public will seek answers to many questions about the causes of that disaster (Koenig, 2007).

Due to a belief in the unfailing protection of society and government (Kumagai et al., 2006), disaster victims look for human agency when constructing explanations. Reporting styles in the media often adjust to reflect this search for responsibility. For example, after Hurricane Katrina, the media showed an apparent shift in the portrayal of authorities from efficient to inefficient as the

disaster response progressed (Littlefield and Quenette, 2007). Similarly, after the Westray coal mine tragedy in Nova Scotia in 1992, initial reports represented the explosion as a natural disaster with loss and suffering yet later reports emphasised human agency and accountability as the public sought answers (O'Connell and Mills, 2003). It has also been found that the damage caused by earthquakes is attributed to the earthquake itself in immediate reports yet attributed to building structures (and therefore human agency) in reports one year later (Cowan et al., 2002). Kumagai and colleagues (2006) argue that this seeking to blame behaviour can highlight the features of the disaster that could have been avoided by human intervention. While this may help to avoid repeat incidents, it can lead to lower public trust in the authorities that are actively working to solve the current problems.

2.2. Media coverage of Hurricane Katrina

In 2005, Hurricane Katrina and the ensuing floods claimed the lives of almost 1,900 people. In New Orleans, Louisiana, a disastrous failure of the levee system caused the vast majority of the city to become flooded. Since the disaster, the media coverage has been heavily criticised for interpreting the events through frames of criminality that only served to reinforce the pervasive, yet unproven, belief that crime levels rise during disasters such as this one (Berger, 2009, Tierney et al., 2006). It has been argued that the media used crime frames to represent African American victims as looters and violent criminals (Tierney et al., 2006), and to build upon existing stereotypes of black, poor populations as dangerous (Berger, 2009). The media continually favoured the noun *looter* over the verb *to loot*. Thus the victims were portrayed as belonging to a 'looter class' rather than carrying out 'looting' as necessary for survival (Berger, 2009).

The media's exclusion of certain groups of victims throughout the disaster has also been criticised. For example, the focus on issues of race may have detracted from other groups that required aid, such as the elderly (Garnett and Kouzmin, 2007). However, it has been argued that the proportion of coverage dedicated to African Americans accurately reflected the racial distribution of

the local population (Voorhees et al., 2007). Rather, it was male victims and those in poverty who were greatly overrepresented.

The use of crime frames also had implications for the portrayal of the involved authorities. Firstly, some reports criticised an absence of authority and government response (Stock, 2007, Berger, 2009). This reporting has faced criticism for boosting negative public perceptions of the capabilities of authorities to respond to disasters (Littlefield and Quenette, 2007, Garnett and Kouzmin, 2007). Secondly, it has been argued that crime and war frames justify and strengthen the power of the military and law enforcement agencies (Tierney et al., 2006, Stock, 2007). This can further entrench the public perception that only the military can effectively restore 'normality' after a disaster. Crime frames may also have bolstered the authority of state power and legitimised jail as a necessary route to restoring order (Berger, 2009).

3. Cognitive Discourse Analysis

To explore the conceptualisations inherent in the media's reporting of the UK's drinking water crisis, this study performs discourse analysis using a recently developed method known as Cognitive Discourse Analysis (CogDA) (Rundblad, 2007). This method fuses elements from Critical Discourse Analysis (CDA) and Cognitive Linguistics.

Cognitive Linguistics claims that the mind is organised by representational conceptual structures that are experienced as real and evidenced in language (e.g. Lakoff and Johnson, 1980). Therefore by tracking the semantic and grammatical patterns in language use, we can find evidence for the mental conceptualisations that organise information and experience. In recent years, several researchers have advocated the integration of Cognitive Linguistics and CDA in order to uncover the pervasive, underlying conceptual structures within texts that can influence audiences (e.g. Hart, 2008, Charteris-Black, 2006, Wodak, 2006).

Cog DA employs a functional approach for the backbone of the analysis, for example, by exploring noun and verb phrases in terms of communicative function rather than parts of speech,

breaking the texts down to clausal level and highlighting techniques such as passive constructions. It also emphasises the effects of language choice; for example creating a clause with the modal verb *should* (e.g. *you should have a drink now*) will give rise to different interpretations of the same clause created with the modal verb *can* (e.g. *you can have a drink now*). To unearth the conceptual structures within the text, CogDA merges these functional considerations with the cognitive approaches of frame semantics (Fillmore, 1982), localist semantics (Anderson, 1971), and conceptual metaphor and metonymy (Lakoff and Johnson, 1980).

3.1. Frame semantics and localist semantics

Frame semantics posits that a frame is a system of related concepts that fit together within a structure (Fillmore, 1982, Lakoff, 2010). Comprehension of one of the concepts in that structure can only occur if the structure as a whole is understood. For example, we cannot understand the concept of A CAR without understanding the entire frame of MODE OF TRANSPORT. Hence, concepts can never be understood in isolation. Furthermore, when one concept is used in language, it evokes the whole structure to which it belongs. Through careful choice of words, a writer/speaker can evoke frames that may not normally be used within the given context or can provide existing frames with new meanings.

Localist semantics (Anderson, 1971) explores how the participants/entities are portrayed in relation to one another by examining the semantic roles they fulfil (e.g. agent, theme, receiver). For example, a localist semantics analysis might consider how different agents operate within the text and what other participants they affect.

CogDA combines these approaches by focusing on the interplay between the semantic roles and frames activated in the text. By analysing which frames repeatedly appear in which semantic roles, overarching linguistic patterns can be discovered that provide evidence for the conceptual structures through which the information in the text is organised.

3.2. Conceptual metaphor and metonymy

Since Lakoff and Johnson's work in the 1980s (Lakoff and Johnson, 1980), metaphor has come to be seen as a conceptual system that maps features from a concrete source domain (e.g. WAR) onto features from an abstract target domain (e.g. ARGUMENTS) in order to aid comprehension. Evidence for these conceptual metaphors (e.g. ARGUMENT IS WAR) can be found in linguistic realisations such as *he's defending his position* and *he won the argument*.

Metonymy, like metaphor, is a way of conceptualising one thing in terms of another. However, the mappings for metonymy occur within the same domain rather than across different domains (Lakoff and Johnson, 1980). For example, when we do not know or do not wish to reveal a specific individual's identity, we may use metonymy, such as *the council sent me a letter* or *the police arrested the thief*.

By breaking the clauses down into their semantic roles, CogDA allows for the rapid identification of metonyms and the roles they fulfil. In addition, by pinpointing repeated combinations of roles (in particular agents) and actions, CogDA easily recognises metaphorical patterns.

4. Aims

Using CogDA, we explore the conceptualisations of the different authorities and the general public in the national and local UK media coverage of the drinking water crisis in 2007. By analysing a variety of linguistic techniques, we aim to show how different authorities were represented with varying degrees of reliability, effectiveness and clarity over their responsibilities. We discuss how these representations may have obscured the roles of the various authorities, which may have led to blurred public conceptualisations of those authorities. We also aim to show how the representation of the affected public throughout the incident may have reduced their understanding of and obligation to comply with the drinking water advice, which potentially put themselves and others in their care at risk.

5. Methods

5.1. Article Selection

An Incident Corpus of articles published between 23rd July and 10th August 2007 was compiled from local newspapers (*The Citizen Gloucestershire*, *The Gloucestershire Echo*, *The Stroud News & Journal*), local television websites (*BBC Gloucestershire*), national broadsheets (*The Guardian*, *The Independent*, *The Times*, *The Telegraph*), national tabloids (*The Mail*, *The Express*, *The Mirror*, *The Sun*, *The Star*) and national television websites (*BBC*, *ITV*, *Sky*). All articles reporting on the incident were downloaded directly from each source's website or from the HighBeam Research online library (www.highbeam.com). Search terms were *Gloucestershire*, *drinking water*, *Severn Trent*, *Mythe*, *Health Protection Agency*, *flood* and/or *advice*. This yielded a total of 788 articles across the four incident stages (Table 1).

Table 1: Incident timeline

Incident stage	Inclusive dates	Incident Corpus	Drinking Water Sub-Corpus	CogDA Sub-Corpus
Water Loss	23 rd – 26 th July	288	57	30
Do Not Drink	27 th July – 2 nd August	284	56	29
Boil Water	3 rd – 6 th August	93	10 ^a	10
Water Safe	7 th – 10 th August	123	19	11
		788	142	80

^a Four articles continued to report Do Not Drink advice; even so, these were categorised in the Boil Water stage because they still represented the advice that was available after the Boil Water notice had been issued.

As our focus is on drinking water, all articles in the Incident Corpus were read to determine if the content considerably related to the drinking water aspects of the incident. An article was deemed as being considerably related to drinking water if at least one sizeable paragraph was devoted to the topic. Notably, one source, the national tabloid *The Star*, had no drinking water related articles. The relevant articles were compiled into a separate Drinking Water Sub-Corpus, totalling 142 articles.

To allow manual CogDA, half of the articles from the Drinking Water Sub-Corpus were selected per source and per incident stage using the online Research Randomizer (www.randomizer.org) (e.g. of the six articles published by *The Daily Mail* during the Do Not Drink stage, three were randomly

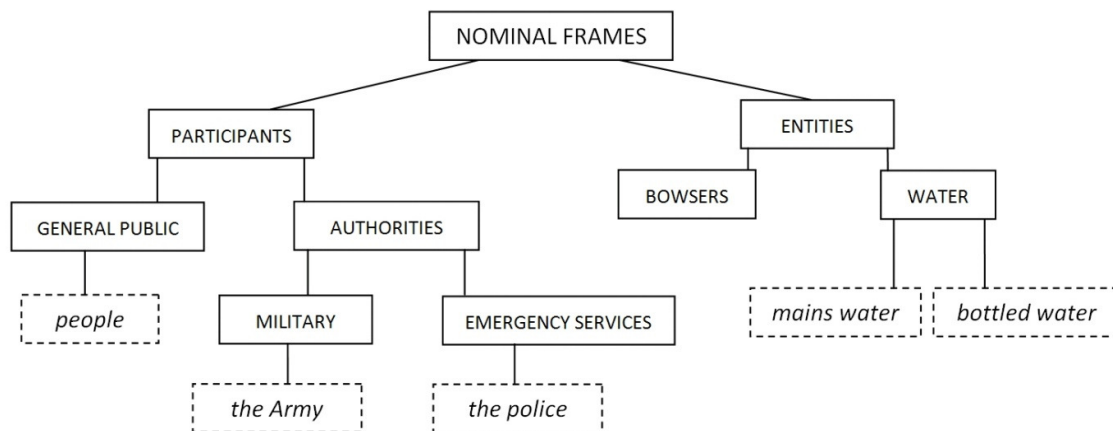
selected). Due to the low numbers of articles for the Boil Water stage, all ten articles were selected. This yielded 80 articles for the CogDA Sub-Corpus.

5.2. Cognitive Discourse Analysis

As aforementioned, CogDA is a linguistic analysis method that incorporates localist semantics and frame semantics to a functional approach to communication.

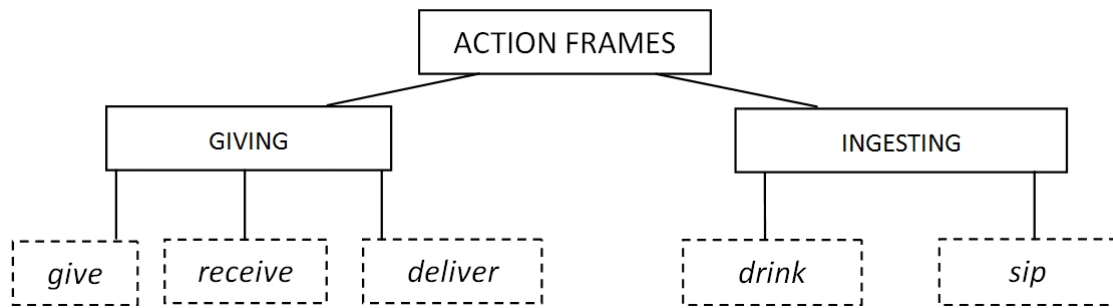
In accordance with Rundblad (2007), we distinguish between nominal frames (which are sub-divided into (living) participants and (non-living) entities) and action frames. An example of the nominal frames discerned within the texts can be found in Figure 1.

Figure 1: Example of classification tree for nominal frames. Frames are in capitals and their related linguistic expressions are in italics.



Similarly, we distinguish between different action frames (e.g. GIVING and INGESTING). As Figure 2 shows, each action frame contains several verbs with related meanings (e.g. INGESTING contains the synonyms *drink* and *sip*).

Figure 2: Example of classification tree for action frames



As is shown in Figure 2, antonyms such as *give* and *receive* belong to the same action frame. For example, in the clause *the patient received advice from the doctor*, the patient cannot receive advice unless the doctor simultaneously gives advice; thus, the one and only real world action that is performed is GIVING but by alternating between *give* and *receive*, we can portray that action from different points of view. The choice of different verbs from the same conceptual frame combined with the participant/entity positioned as grammatical subject will give rise to different interpretations.

In our analysis, firstly we tagged each noun phrase and verb phrase into their nominal and action frames. Secondly, the phrases were labelled by the semantic role they performed in each clause using an approach taken from localist semantics. The semantic roles discerned were:

Agent – the participant performing the action

Theme – the participant/entity upon which the action is performed

Receiver – the participant/entity which receives/benefits from the theme

Source – the participant/entity from which the theme originates

Instrument – the participant/entity which aids the action

Thirdly, the grammatical subject and predicate of each clause were marked. The combination of classifying both semantic agent and grammatical subject allowed us to distinguish between active voice (i.e. the agent is the subject) and passive voice (i.e. the agent is not the subject). In the

examples in Table 2, bold marks grammatical subject; thus, we can see that the first example is active and the second is passive. The third example uses active voice yet the agent is not the subject; this type of construction is discussed in detail in subsequent paragraphs.

Table 2: Examples of grammatical subject, implication and ellipsis

ID	Clause	Agent	Predicate	Theme	Receiver
1	people panic and stockpile	people	panic		
		<i>people</i>	stockpile	[WATER]	
2	bottled water was delivered	[MILITARY]	was delivered	bottled water	
3	we get reports of crime and disorder	[GENERAL PUBLIC]	get	reports of crime and disorder	we

In addition to those participants/entities and actions that were explicitly stated in the texts, we also assigned implied and ellipped participants/entities and actions to their relevant frames. In Table 2, square brackets mark implication and italics mark ellipsis. Ellipsis is very common in English (Nariyama, 2004), and in the first example we see that the word *people* is ellipped from the second clause. Similarly, the context of Examples 2 and 3 reveals that the implied agent is the military and the general public, respectively.

In Examples 1, 2 and 3, we find instances of the following nominal frames: GENERAL PUBLIC, WATER, MILITARY, INFORMATION and EMERGENCY SERVICES. In Example 3, *we* (=EMERGENCY SERVICES) is the subject of the clause; however, the verb *get* signifies that another participant must be performing a GIVE action. Therefore, in accordance with localist semantics (Anderson, 1971), *we* is assigned to the receiver position, the verb *get* is assigned to the action frame GIVING and we can infer an implied agent from the GENERAL PUBLIC frame.

The strengths of CogDA lie in its capacity to unveil the participants/entities and actions that are not explicit within the text. Therefore, in addition to addressing the roles and actions of the authorities and the general public, the analysis emphasises which participants/entities are highlighted and

downplayed through the use of implication and ellipsis. Metonyms, metaphors and passive voice, as established techniques for hiding participant agency, are also explored. In addition to qualitative analysis, semantic and grammatical tags were entered into SPSS 16 to allow descriptive quantitative analysis.

6. Results and Discussion

Throughout the incident, the media used a range of linguistic devices to represent the central agents and their actions. We work through those linguistic devices to unravel, in particular, the portrayal of the authorities and the general public. We demonstrate how the language used may have obscured the authorities' responsibilities and reduced the public's obligation to comply with the drinking water advice. We discuss the implications for public understandings of both authority roles and health advice issued in times of emergency.

6.1. Overview

The drinking water crisis resulted in a large amount of media coverage at both the national and local level. As CogDA breaks the texts down to clause level, all frequencies represent the number of clauses unless otherwise stated. In total, the analysed articles contained 5525 clauses.

Unsurprisingly, the total amount of media coverage tailed off as the incident progressed. Therefore the Water Loss stage represents 46.4% of the analysed clauses and the Do Not Drink stage represents 37.1%. Following this, the coverage dropped dramatically. The Boil Water stage represents 7.2% of the coverage and the Water Safe stage represents 9.3%.

6.2. Agents

Looking at which participants fulfil the role of agent, it is clear that there are three agent frames performing the majority of actions: THE GENERAL PUBLIC, THE WATER COMPANY and the other

MAJOR AUTHORITIES (Table 3). This latter group includes THE MILITARY, THE EMERGENCY SERVICES, POLITICIANS, GOVERNMENT DEPARTMENTS, COUNTY COUNCILS, HEALTH AUTHORITIES and CHARITIES. There is also a group of UNSPECIFIED AUTHORITIES; these are clauses in which there is an authority action yet there is not enough information to discern which authority is intended.

Table 3: Clauses per agent

Agent	n	%
GENERAL PUBLIC	1744	31.6
WATER COMPANY	1376	24.9
MAJOR AUTHORITIES	863	15.6
UNSPECIFIED AUTHORITIES	408	7.4
No agent/non-human agents/all other agents	1134	20.5
	5525	100.0

We now turn to look at how these agents are represented through implied and ellipted references rather than explicit references, and metaphor and metonymy rather than literal references.

6.2.1. *Implied, ellipted and explicit agency*

One technique for hiding the agent is to omit it from the clause entirely. In these cases, the grammatical subject represents other pieces of information relevant to the clause's meaning. For example, the writer may use a dummy subject (e.g. *there is no water*), place the theme or receiver in subject position (e.g. *this water is not for drinking*), use a dependent clause as the subject (e.g. *drinking this water is a health hazard*) or use a passive construction (e.g. *water was cut*). The reader therefore only has the surrounding context from which to infer the agent.

Throughout the coverage, THE WATER COMPANY and THE GENERAL PUBLIC are persistently omitted from the clauses in which they are the agent (Table 4). For THE WATER COMPANY, 56.2% (n=773/1376) of their actions are represented with an implied agent and for THE GENERAL PUBLIC's actions, this stands at 47.4% (n=826/1744). For example, clauses such as *there is no water* refer to the water company's inability to provide water; yet their agency, and hence responsibility, can only

be found through inference. Likewise, clauses such as *this water is not for drinking* mean that the general public should not consume the current supply even though they are not signalled in the text.

While an implied agent can mostly be discovered through inferences from the semantic context, an ellipted agent normally arises from the syntax of the English language. As the agent can be retrieved from preceding clauses, it has higher visibility in the text than an implied agent (Rundblad, 2007). In the reports, THE GENERAL PUBLIC and THE MAJOR AUTHORITIES are often ellipted agents in dependent clauses (e.g. ‘...experts warning residents not to consume [mains water]’ (The Times, 2007)/‘police and council officers were on hand at each of the sites, marshalling the long queues’ (The Gloucestershire Echo, 2007a)).

Agents cannot simultaneously be implied, ellipted and explicit within the same clause. As THE WATER COMPANY and THE GENERAL PUBLIC have high levels of implication and ellipsis, it follows that they have low levels of explicit agency. THE WATER COMPANY and THE GENERAL PUBLIC are the explicit agents of their actions in only 32.0% (n=441/1376) and 27.4% (n=478/1744) of clauses, respectively. Contrasting this, THE MAJOR AUTHORITIES are explicit agents in 57.5% (n=496/863) of their clauses (e.g. ‘Gold Command, the county’s emergency response team, has issued a health and safety notice’ (The Gloucestershire Echo, 2007e)).

Table 4: Implied, ellipted and explicit positioning of agents

	GENERAL PUBLIC		MAJOR AUTHORITIES		WATER COMPANY	
	n	%	n	%	n	%
Implied	826	47.4	177	20.5	773	56.2
Ellipted	440	25.2	190	22.0	162	11.8
Explicit	478	27.4	496	57.5	441	32.0
	1744	100.0	863	100.0	1376	100.0

Throughout this crisis, the involvement of so many different authorities in the provision of temporary water supplies may have left affected consumers unsure of which authority was tasked with which responsibility. This is despite the fact that the provision of safe drinking water in the UK is the water company’s legal responsibility. The lack of visibility of the water company is incredibly worrying as it signifies an indistinguishable role for the water company throughout the incident.

Rather than clarifying the situation, the opacity with which the water company was represented by the media may have obscured public conceptualisations of the water company's role. This may have diminished the affected public's confidence in the water company, contributed to widespread confusion and rendered people unaware of to whom to turn for water advice. Moreover, the lack of clarity hints at a widespread gap in public knowledge about the responsibilities that the water company are obliged to fulfil in times of supply failure.

The media's portrayal of the other major authorities (such as the military and the police) as visible and prominent overshadows the actions of the water company. Previous studies have also found that, after disasters, the military and law enforcement agencies are often represented as the only authorities capable of restoring the normal way of life (Tierney et al., 2006, Stock, 2007). Since the drinking water crisis, several official reports have stressed that the emergency services were inundated with non-emergency calls that wasted valuable time (Fire and Rescue, 2007) and that the police were expected to be 'everything to everyone' (Gloucestershire Constabulary, 2008). It would therefore appear that public conceptualisations of the police, fire and rescue, and ambulance services (i.e. the emergency services available by dialling 999) are comprised of an excessively expansive range of responsibilities whereas the conceptualisations of responders such as water companies (and potentially other utilities) are relatively restricted. As a larger part of this project, perceptions of the water company were probed in focus groups with members of the affected public (Rundblad et al., 2010). The findings confirmed that public knowledge of the water company's role was relatively limited and that they perceived the military and the police as having the most control over the incident. Media portrayals that continually favoured the emergency services over the water company would only have served to reinforce this perception of all-encompassing emergency services.

In addition, the frequent absence of clear agency for the general public may have concealed the public's own responsibility for taking actions to keep themselves and others safe. Without an overt role in the incident, the general public may have lacked motivation to comply with the health

advice. This has implications for future events as previous studies have found that public responsibility for advance mitigation can be diminished if the media focus on authority accountability rather than community and individual accountability (Barnes et al., 2008).

6.2.2. *Metaphors and non-human agency*

Non-human agents (which can be either living participants or inanimate entities) constitute only a small proportion of agents (11.8%, n=653/5525). Of these non-human agents, there are three main groups: THE FLOOD WATER (33.2%, n=217/653), THE CRISIS (22.1%, n=144/653) and CONTAMINANTS (15.6%, n=102/653). While many non-human actions are unremarkable (for instance, *rivers run*, *contaminants pollute* and *the crisis continues*), certain non-human agents are afforded active agency through metaphorical representations.

Considering the abundance of metaphors that have been found in previous media discourse analysis of health issues (e.g. Larson et al., 2005, Chiang and Duann, 2007), overall use of metaphors in this corpus is surprisingly low (3.2%, n=179/5525). However, of those metaphors, it is THE CRISIS and THE FLOOD WATER that are the dominant metaphorical agents (Table 5). In fact, as metaphors, both THE CRISIS and THE FLOOD WATER are frequently personified. Thus, the resulting metaphors are those of THE CRISIS IS A LIVING ENTITY (e.g. 'last weekend's flooding crippled the county' (The Citizen Gloucestershire, 2007b)) and THE FLOOD WATER IS A LIVING ENTITY (e.g. 'it was forced out of action by the floods' (The Gloucestershire Echo, 2007e)). Moreover, the metaphorical agents perform CAUSE actions in 43.0% (n=77/179) of all metaphorical clauses (e.g. 'the ensuing water shortage resulted in the police guarding bottled water in supermarkets' (The Times, 2007)). THE CRISIS and THE FLOODWATER are therefore more than just living entities; they are living entities with force and purpose.

Table 5: Metaphorical clauses per agent

Agent	n	%
CRISIS	86	48.0
FLOOD WATER	39	21.8
FLOODING EVENT	14	7.8
RAIN WATER	11	6.1
Other agent	29	16.3
	179	100.0

Metaphors allow certain aspects of a situation to be highlighted or downplayed. Therefore, assigning causality to the crisis and the floodwater is one way to tone down human responsibility for the crisis. This method of evading human accountability is in fact quite common after disasters; the crisis is often represented as the most active agent with a life of its own (Harwell, 2000, Cowan et al., 2002).

6.2.3. Metonymy

Metonymy is particularly common in situations where the exact actor cannot be identified. Across various contexts, authority figures are frequently represented via metonyms (Rundblad, 2007). Throughout the media coverage, when authorities are written into the agent position, they are expressed as metonyms in 40.6% (n=381/939) of clauses (Table 6). For example, 'Gloucestershire County Council... welcomed the news' (The Daily Mail, 2007)/'The Army was drafted in to distribute millions of bottles of water...' (The Daily Express, 2007). However, the different authorities vary in their level of metonymy when in agent position. THE MILITARY, THE ENVIRONMENT AGENCY and THE HEALTH AUTHORITIES all have particularly high levels.

Table 6: Metonyms per participant in agent position

Agent	Explicit	Of which are metonyms	
	n	n	%
MILITARY	39	23	59.0
ENVIRONMENT AGENCY	36	21	58.3
HEALTH AUTHORITIES	50	25	50.0
WATER COMPANY	441	207	46.9
CHARITY	41	14	34.1
EMERGENCY SERVICES	155	49	31.6
COUNCIL	69	19	27.5
POLITICIANS	108	23	21.3
	939	381	40.6

Seen as the Army very rarely acts as individuals, the high proportion of metonymy for the military is not a surprising finding. Similarly, individual politicians are relatively straightforward to pinpoint and so this accounts for the lower proportion of metonyms for this group. Yet the fact that over 40% of authority agents are represented via a metonym raises questions about the ability of the media to form a clear, unobstructed representation of the authorities. Hiding individuals within metonyms contributes to the overarching finding that the conceptualisations of the authorities' roles in this incident were extremely indistinct.

6.3.Actions

Table 7 shows the actions that represent more than 3.0% of the total clauses. As this was a crisis about provision and loss of water, the GIVE frame includes all verbs related to water provision, such as *restore*, *supply*, *deliver*, as well as the opposite of provision, namely *cut* and *interrupt*. All in all, GIVE actions account for 15.7% (n=866/5525) of clauses. In the majority of these (54.7%; n=474/866), the GIVE action is performed by THE WATER COMPANY. The similarly high frequency of SAY actions (15.3%; n=843/5525) includes all verbs of speech and is driven by the amount of advice reported from authority groups.

Table 7: Clauses per action

Action	n	%
GIVE	866	15.7
SAY	843	15.3
CAUSE	437	7.9
USE	394	7.1
THINK	277	5.0
HYGIENE	274	5.0
INGEST	235	4.3
CHANGE	211	3.8
TAKE	179	3.2
EXIST	165	3.0
Other actions	1644	29.8
	5525	100.0

We now look at how these actions are represented with passive voice rather than active voice, epistemic modality rather than deontic modality and ambiguous rather than specific terms. We also explore the interplay between various actions, agents and linguistic devices.

6.3.1. *Passive Voice*

Passive voice is a well-known technique for hiding the agent of an action. Across all clauses, passive verb constructions represent 17.8% (n=981/5525), with significantly higher use in national (20.0%; n=681/3406) than local sources (14.2%; n=300/2119).

Many actions carried out by authorities are represented by an UNSPECIFIED AGENT (7.4%; n=408/5525). These are actions that could have been performed by a range of authorities of which the intended one is unidentifiable from the context. Agentless passives are used in 45.3% (n=185/408) of these clauses (e.g. 'residents are being warned that the water is undrinkable...' (The Citizen Gloucestershire, 2007c)), again reflecting a lack of specificity over which authorities were tasked with which responsibilities.

As described by Rundblad (2007), in medical contexts, passive voice and agent metonymy are rarely used in the same clause. In this media coverage, we see the same pattern; the two techniques infrequently occur together. The preference for either technique is dependent upon the agent; when authorities are agents, they are more likely to be hidden by metonyms than by passives. When the general public are agents, they are more likely to be hidden by passives than by metonyms (Tables 8-10). For example, the following two clauses both employ the GIVE action frame:

(1) 'Emergency services are issuing bottles of water on the streets...' (The Gloucestershire Echo, 2007d)

(2) '...the Echo has been inundated with complaints from readers...' (The Gloucestershire Echo, 2007c)

Example (1) has an AUTHORITY as agent, uses active voice and represents the agent through metonymy. Example (2) has THE GENERAL PUBLIC as agent, uses passive voice and states the agent explicitly. This use of passive voice pushes the general public further into the background, which may have weakened their sense of purpose and agency within the incident. This is an issue to which we later return.

Tables 8-10: Passive voice and metonymy for THE GENERAL PUBLIC, THE MAJOR AUTHORITIES and THE WATER COMPANY as agent

	GENERAL PUBLIC (N=1744)			MAJOR AUTHORITIES (N=863)			WATER COMPANY (N=1376)	
	No metonym	Metonym		No metonym	Metonym		No metonym	Metonym
	n (table %)	n (table %)		n (table %)	n (table %)		n (table %)	n (table %)
Active	1420 (81.4)	41 (2.4)		520 (60.3)	241 (27.9)		902 (65.6)	271 (19.7)
Passive	283 (16.2)	0		81 (9.4)	21 (2.4)		191 (13.9)	12 (0.9)

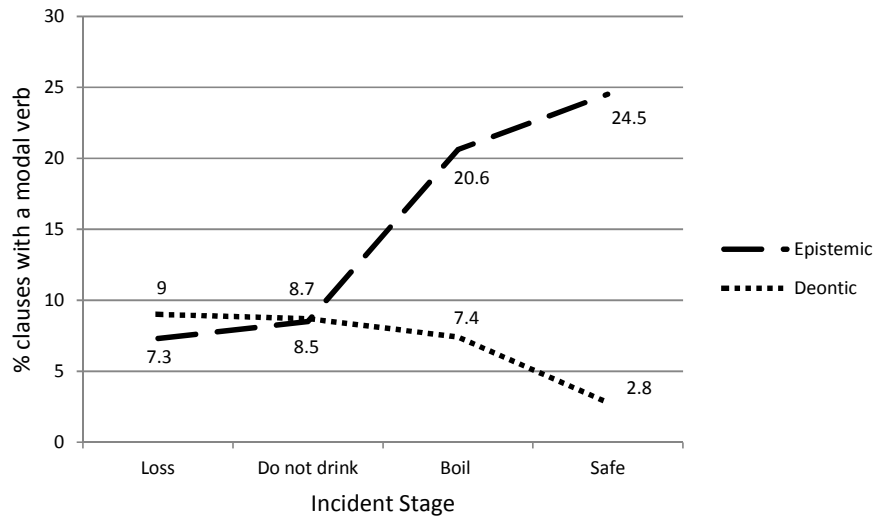
6.3.2. Modality

Perhaps the most worrisome aspect of the media coverage is the language used to advise the general public about the actions that are dangerous and safe to perform with both the temporary water supplies and the restored mains water.

When the general public are the agent, 18.4% (n=321/1744) of their actions are modified by a modal verb. As the incident progresses, the general public's actions with epistemic modality increase whereas their actions with deontic modality decrease (Figure 3). This pattern is created by the fact that epistemic and deontic modality are employed differently within the reports. Deontic modals are frequently coupled with negatives in order to instruct the public *not to do* something (e.g. 'people should not try to hose down flooded areas' (The Telegraph, 2007)). These instructions primarily occur in the early stages of the incident in relation to both the flood water and mains water. In contrast, epistemic modals are used in positive verb phrases that advise the public what they *can do* with their mains water (e.g. 'the boiled tap water can be used for drinking, cleaning

teeth, washing dishes, preparing food and ice-making' (The Citizen Gloucestershire, 2007a)). The frequency of epistemic modality therefore increases as the water becomes safe to use for various activities.

Figure 3: Modal verbs per incident stage when the general public are agent



However, the significant problem with the use of epistemic modals (such as *can*) is that the water instructions are presented as a choice rather than a necessity. This may have eroded the public's obligation to comply with the advice and thus made them more likely to put themselves at risk by following unsafe procedures. Previous studies have highlighted that public compliance to health advice improves when it is constructed with deontic modals (such as *should*) rather than epistemic modals (Edworthy et al., 2004). Thus, drinking water advice presented with deontic modals (Example (3)) would be more effective at creating a sense of obligation and ensuring public compliance (and thus public safety) than advice presented with epistemic modals (Example (4)):

(3) *you should not drink the tap water*

(4) *you cannot drink the tap water.*

6.3.3. *USE actions*

When THE GENERAL PUBLIC are the agent, 37.5% (n=654/1744) of their actions are performed upon WATER (e.g. *drink, boil*). This is not a surprising finding considering the nature of the disaster. What is surprising is that 36.8% (n=241/654) of their actions performed upon WATER are USE actions (e.g. ‘...bottled water can be used as an alternative’ (The Gloucestershire Echo, 2007b). This is compared to 20.6% (n=135/654) for DRINK actions and 12.2% (n=80/654) for BOIL actions.

USE actions are problematic in that they are incredibly vague and mask the specific action that is the intended target of the instruction. Take the examples:

(5) *use boiled water for drinking*

(6) *boiled water can be used for drinking*

In both Examples (5) and (6), the key action DRINK is sidelined into a dependent clause and the key action BOIL is hidden within a noun phrase. Public comprehension of the advice may have been hindered by this indirect and vague style of delivery. In contrast, simple clauses with imperatives or deontic modals express the instruction much more directly by placing the target action BOIL as the main verb and thus as the focus. For example:

(7) *boil the water*

(8) *you should boil the water*

A linked problem is that the verb *use* requires a qualifying dependent clause that creates a dense reporting style. In the Do Not Drink and Boil Water stages, independent clauses with the verb *use* were often succeeded by lengthy dependent clauses, for example ‘tap water can now be used for cleaning teeth, washing dishes, preparing food and infant formula and ice-making’ (Stroud News and

Journal, 2007). For people with weak literacy skills, this complex style may have rendered the advice difficult to understand.

In fact, USE actions were not only widespread in the media coverage. They were also omnipresent in the water notices, the daily press conferences and the radio interviews given by the water company and other authorities. Of the 394 instances of USE in the media reports, 27.4% (n=108/394) are pasted from advice leaflets, 34.5% (n=136/394) are part of direct reported speech and 19.8% (n=78/394) are part of indirect reported speech. Thus, only 18.3% (n=72/394) are the journalists' own voices. It therefore appears that USE for water actions is pervasive throughout all areas of public life. Thus the media cannot be held solely accountable for its extensive presence; however, the inclusion of these ambiguous actions may have further cemented the public's vague conceptualisations of safe water actions.

The unselective inclusion of USE actions also points to a wider problem. Do Not Drink and Boil Water notices are in fact two separate water notices that entail different safe and dangerous water activities. If issued a Do Not Drink notice, then boiling the water will not make it safe for human ingestion. This distinction was shrouded by the USE actions that were ubiquitous throughout every stage of the incident. The key information that boiling the water offers no health protection was implied at best, totally omitted at worst. During the Do Not Drink notice, consumers did indeed boil their tap water and then ingest it (Rundblad et al., 2010). We suggest that this low compliance was driven by the folk belief that boiling the water will always remove all contaminants. The media reports may have reinforced this belief through indiscriminate reporting of USE actions and thus the absence of a clear cut distinction between water notices.

6.3.4. The interplay of USE actions, modality and passive voice

Adding to the problems of ambiguity inherent in USE, USE actions performed upon water are also expressed with high levels of epistemic modality (32.0%; n=77/241). Moreover, clauses with both epistemic modality and USE actions are nearly always constructed using the passive voice (96.1%;

n=74/77). In fact, passive voice represents 58.9% (n=142/241) of all USE actions performed on water by the general public. Within these constructions, the general public are frequently an omitted agent. Putting this all together results in sentences such as:

(9) '...tap water can now be used for cleaning teeth, washing dishes, preparing food and infant formula and ice-making' (Stroud News and Journal, 2007)

(10) 'Unboiled tap water can also continue to be used for flushing the toilet, washing, bathing and washing clothes' (Sky News, 2007)

In summary, these sentences repeatedly adhere to the following formulaic structure:

Implied GENERAL PUBLIC agent + vague USE action + passive voice + epistemic modal + dependent participles

When broken down into these basic components, it becomes apparent that the water advice was not delivered with language that would have encouraged the affected public to comply. The public have no obvious agency, the actions they are advised to perform are not brought to the fore and the instructions are frequently presented as a choice rather than an obligation. On top of all of this, the reporting style uses an embedded clause structure that creates unnecessary complexity. Public comprehension of and compliance to the drinking water advice could have been enhanced through the use of a clearer linguistic style in communication from both the media and the authorities.

7. Conclusions and Implications

The drinking water crisis of summer 2007 was the UK's largest peacetime emergency since World War II (Pitt, 2008). The flooding of the Mythe water treatment works due to heavy rain caused 350,000 residents to lose their drinking water supply for up to 17 days. When mains water was

returned, residents were issued a Do Not Drink notice followed by a Boil Water notice. Due to the scale of the emergency, over 25 agencies were involved in the disaster response. Using CogDA, this study has examined the conceptualisations of the different authorities and the general public in the UK media reports of the incident.

7.1. Authorities

In times of mains water supply failure in the UK, it is the legal responsibility of the water company to provide temporary supplies and to restore mains water as quickly and as safely as possible. Thus, throughout this incident, the water company were arguably the most important authority. However, the media representations of the water company did not reflect nor reinforce this fact. Throughout the coverage, the water company were constantly backgrounded by use of linguistic devices such as implication and ellipsis. In fact, their agency was only explicitly stated for just over a quarter of the actions of which they were the agent. This lack of visibility may have obscured the public's conceptualisations of the water company and their responsibilities. If the public were not fully aware of the water company's role, then they may not have known to whom to turn for water advice. This may have added to the sense of confusion among much of the affected public and led to higher levels of non-compliance with the advice. Furthermore, the media's consistent omission of the water company suggests that there is a large gap in the public's knowledge of the water companies' duties in times of emergency.

In contrast, the other major authorities (such as the military and the emergency services) were highly visible within the media reports. After the incident, the emergency services reported that the public had turned to them with many requests that were outside of their remit and would certainly not be classed as an emergency. This raises the problem of tying up the emergency services' resources with responding to non-life-threatening situations. The media's focus on a narrow range of major authorities rather than a broad range of responders may have reinforced the

apparent public conceptualisation that the emergency services can and should deal with a vast array of problems, even those that do not pose an immediate threat.

In times of emergency, it is vital that the affected public are aware of which authorities are tasked with which responsibilities. It is thus essential to improve public understanding of the water companies' duties and roles in times of supply failure. This would decrease public confusion, increase public trust in the water company and raise compliance levels to drinking water advice. In a similar vein, it is also necessary to improve public knowledge of the wide range of responders and their respective roles. This would help the affected public to make an informed choice about which authority to consult in non-life-threatening situations and thus reduce the strain on the emergency services.

7.2. The general public and drinking water advice

While the authorities have a responsibility to keep people safe in times of emergency, the affected public also have to be able to help themselves as far as possible. By issuing clear advice, authorities can ensure that the public are aware of dangerous behaviours and can take steps to protect themselves against injury or illness. However, this communication will not be successful if the language used in the health advice obscures the key messages and fails to encourage the affected public to comply.

Throughout the drinking water crisis, the media continually hid the general public in their reports through implication and agentless passives. Similarly to the water company, these linguistic devices masked the role of the general public, which could have contributed to a lack of motivation to act or take on any personal responsibilities. Moreover, the most important actions that the general public needed to take were those related to their drinking water (both temporary and mains supplies). Yet it is within the drinking water advice that the general public were hidden to the largest extent.

As well as this backgrounding of the general public through implication and passives, the drinking water advice was constructed and reported using additional linguistic devices that would not have encouraged public compliance. The advice was consistently reported with epistemic modals that presented the advice as a choice rather than a necessity, with ambiguous actions such as *use* rather than specific actions such as *drink* and with key actions sidelined into dependent clauses rather than as the focus in independent clauses. Additionally, the sentence structure of the advice tended to include chains of dependent clauses, which led to a complex style that can be difficult to understand.

In future water incidents, public compliance could be enhanced by ensuring that instructions (whether directly from authorities or reported by the media) are as easily comprehensible as possible. We conclude by presenting a set of recommendations that could help authorities to construct clear, easy to follow health advice (Table 11).

Table 11: Recommendations for health advice

Include	Avoid
Explicit public agency	Implied or hidden public agency
Deontic modals or imperatives	Epistemic modals
Active voice	Passive voice
Specific words (e.g. <i>drink</i>)	Ambiguous words (e.g. <i>use</i>)
Key actions in independent clauses	Key actions in dependent clauses
Short sentences with independent clauses	Long sentences with dependent clauses

These recommendations would improve the clarity of the language and thus increase public comprehension of the risky and safe behaviours. As a result, public compliance to the advice may also increase. It may also be worthwhile for health officials' training to include language courses that outline how specific linguistic constructions can clarify or obscure the intended message, and how this can impact public understanding and compliance.

Public health education should also target the false belief that boiling water *always* makes it safe to ingest. In this incident, a Do Not Drink and a Boil Water notice were issued one after the other. However, across both of these notices, the media and the authorities favoured the vague verb *use* instead of specific verbs (such as *drink* and *boil*). The distinction between the two notices

was therefore blurred. This may have led the public to conceptualise the risky and safe behaviours as the same for both of these notices. In future Do Not Drink notices, the risks of ingesting boiled tap water need to be emphasised even further.

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